2007-2008 Virginia Influenza Season Summary Report (Abridged Version)

Virginia Department of Health, Office of Epidemiology
Division of Surveillance and Investigation

Virginia Influenza Surveillance

Influenza is an acute respiratory disease caused by influenza type A or B viruses. It is a common and highly contagious disease with well-defined seasonal variation. Typical features of influenza include abrupt onset of fever and respiratory symptoms such as cough and sore throat, as well as systemic symptoms such as headache, muscle aches, and fatigue. The clinical severity of infection can range from asymptomatic illness to primary viral pneumonia and death. On average, 5 to 20 percent of the population of the United States contracts influenza each year.[1] More than 200,000 people are hospitalized from complications resulting from influenza illness, and approximately 36,000 people die from influenza each year.

Influenza surveillance is undertaken to determine when and where influenza activity is occurring, track influenza-related illnesses, determine which types of influenza viruses are circulating, detect changes in influenza viruses, and measure the impact of influenza on morbidity and mortality. Laboratory characterization is important because influenza viruses undergo constant antigenic change. Such information aids the selection of optimal influenza vaccine components each year.

The Virginia Department of Health (VDH) uses multiple sources of information to perform influenza surveillance activities each season. For the 2007-2008 influenza season, these data sources included: information on patients presenting to hospital emergency departments or urgent care centers with influenza-like-illness (ILI), laboratory reports of influenza positive specimens, information from outbreak investigations, reports of influenza-associated deaths in the pediatric population, and data on over-the-counter medication sales. A combination of these data were used to determine weekly influenza activity levels, summarize the length and severity of the influenza season, and characterize the prevalence of influenza types and strains throughout the season.

Weekly Influenza Activity Levels

Each week during the influenza season, counts of patient visits to hospital emergency departments and urgent care centers for ILI, laboratory reports of influenza, and influenza outbreak surveillance data were used to classify influenza activity as sporadic, local, regional or widespread.[2] Local activity began during the week ending November 24, 2007, corresponding to week 47 (Appendix A, Graphs 1a). The activity level increased directly from no activity to local activity, skipping over sporadic activity. Regional activity was reached the week ending January12, 2008 (week 2), and widespread activity was observed from weeks 3 through 12 (weeks ending January 19 through March 22, 2008).

VDH ILI Surveillance

To assess influenza-like-illness (ILI) activity, the chief complaints of patients visiting emergency departments and urgent care centers was used. This information is sent to VDH in automated daily transmissions from facilities around the state to allow for the monitoring of

[1] CDC. Coordinating Center for Infectious Disease. http://www.cdc.gov/flu/

[2] For a more detailed explanation of activity levels, see: http://www.vdh.virginia.gov/Epidemiology/Surveillance/Influenza/index.htm

emerging disease syndromes. Seventy-three sentinel facilities participated in the Virginia ILI surveillance system during the 2007-2008 influenza season, although only 62 provided data consistently each week. Patients presenting with complaints of fever and cough or fever and sore throat were classified as having influenza-like-illness.[3]

ILI data from week 28 through week 38 (July 8, 2007 through September 16, 2007) were used to determine the baseline in Virginia for each of the five planning regions. Thresholds were calculated by multiplying the average baseline value by 2.5. During the rest of the season, levels over this threshold were considered elevated and contributed to determination of the activity level within the state. An overlay of weekly ILI counts in Virginia with the reported activity level illustrates that the weekly activity level correlated well with trends in ILI count activity (Graph 1b).

Graphs 2a and 2b illustrate the weekly surveillance ILI counts and percentages by region. Similarly, Graphs 3a and 3b summarize overall ILI activity by week for the 2007-2008 compared to the 2006-2007 influenza seasons in Virginia. For the 2007-2008 season, peak ILI activity occurred during the week ending February 16, 2007 (week 7). The percentage of visits due to ILI peaked at 2.76% during this week.

Influenza Outbreaks

A total of 55 outbreaks of influenza were reported to the Virginia Department of Health during the 2007-2008 season. Of these, 31 were laboratory confirmed outbreaks and 24 were suspected outbreaks. The first confirmed outbreak was reported on January 17, 2008 (week 3), and the last on April 4, 2008 (week 14). The first suspected outbreak was reported November 27, 2007 (week 48), and the last on May 22, 2008 (week 21).

Influenza-Associated Childhood Deaths

Three influenza-associated pediatric deaths were reported to VDH during the 2007-2008 season. All three deaths occurred in the month of February (between weeks 7 and 9). Nationwide, CDC received a total of 72 reports of influenza-associated pediatric deaths during the 2007-2008 season.

Virginia Laboratory Surveillance

Laboratory surveillance in Virginia was conducted by combining data from three sources: specimens from sentinel physicians and outbreaks that are analyzed at the Virginia Division of Consolidated Laboratory Services (DCLS), reports from routine patient diagnostic specimens that are tested by DCLS and private laboratories, and data from the CDC's National Respiratory and Enteric Virus Surveillance System (NREVSS). During the influenza season, sentinel providers throughout Virginia submitted samples from patients with ILI to DCLS for analysis. These specimens were requested by VDH to detect the seasonal emergence and decline of influenza throughout the state. As part of routine disease reporting, laboratories including DCLS, Lab Corp, Quest Diagnostics, and ARUP Laboratories submitted positive influenza reports to VDH. In addition, data from influenza laboratory reports sent to NREVSS from Virginia Commonwealth University Medical Center and the University of Virginia Clinical Virology Laboratory were considered. The following laboratory testing procedures were considered sufficient for classification of influenza: DFA (direct fluorescent antibody), PCR (polymerase chain reaction), and viral culture.

During the 2007-2008 season, VDH received reports of a total of 527 specimens with detectable influenza virus. Of the influenza positives reported, 415 (79%) were type A and 112

[3] Fever defined as temperature greater than or equal to 100 degrees F(38.8 degrees C).

(21%) were type B. Of the type A viruses reported, 310 (75%) were of unknown subtype, 96 (23%) were subtype A/H3, and 9 (2%) were subtype A/H1.

Each year DCLS submits influenza isolates from Virginia to CDC for antigenic characterization, which is carried out by the World Health Organization Collaborating Center for Surveillance, Epidemiology and Control of Influenza. For the 2007-2008 season, antigenic characterization was conducted for a total of six influenza isolates from Virginia. Three of these isolates were A/Brisbane/10/2007-like (H3N2), while two were A/Wisconsin/67/2005-like (H3N2). The final isolate was characterized as A/Solomon Islands/03/2006-like (H1N1). A/Wisconsin/67/2005-like was the 2007-2008 A(H3N2) vaccine component, and A/Solomon Islands/3/2006-like was the A(H1N1) vaccine component. However, A/Brisbane/10/2007-like (H3N2) did not match the 2007-2008 A(H3N2) vaccine component, A/Wisconsin/67/2005-like, but was a recent variation of it.

National Laboratory Surveillance

Nationally, viral data reported to the World Health Organization (WHO) and NREVSS laboratories in the United States during the 2007-2008 influenza season through May 17, 2008 indicated that influenza A and B viruses accounted for 71.2% and 28.8% respectively of influenza viruses characterized in the United States. [4] Of influenza A viruses subtyped, 26.3% were influenza A (H1N1) viruses, and 73.7% were influenza A (H3N2) viruses. Influenza A (H3N2) viruses predominated starting in January. In the final weeks of the season, however, the majority of influenza viruses isolated were influenza B viruses.

Antigenic characterization of a subset of these viruses by CDC indicated that 68% of A (H1N1) viruses were A/Solomon Islands/3/2006-like, the 2007-2008 A (H1N1) vaccine component. Twenty-seven percent of A(H1N1) viruses were A/Brisbane/59/2007-like. Twenty one percent of influenza A (H3N2) viruses identified were characterized as A/Wisconsin/67/2005-like, which was the A (H3N2) vaccine component. However, 65% of A (H3N2) viruses were A/Brisbane/10/2007-like, a recent antigenic variant of the A/Wisconsin/67/2005-like viruses. In addition, 97% of antigenically characterized B viruses were B/Florida/04/2006-like viruses belonging to the B/Yamagata lineage. This lineage is antigenically distinct from the B/Malaysia/2506/2004-like component of the 2007-2008 vaccine, which belongs to the B/Victoria lineage.

Influenza Vaccine

For the 2007-2008 season, six manufacturers were licensed to produce vaccine for the United States, and they produced a record number of approximately 140 million doses.[5] This is approximately 20 million more doses than was produced in the previous season. The trivalent influenza vaccine for the 2007-2008 season included A/Solomon Islands/3/2006-like (H1N1),A/Wisconsin/67/2005-like (H3N2), and B/Malaysia/2506/2004-like viruses.

Based on recommendations from the ACIP, the trivalent influenza vaccine for the 2008-2009 season will include the following virus strains: A/Brisbane/59/2007-like **(**H1N1),A/Brisbane/10/2007-like (H3N2), and the B/Florida/4/2006-like antigens.[6] The

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[4] CDC, Coordinating Center for Infectious Diseases, Influenza Division. FluView, 2007-2008 Influenza Season Week 20, ending May 17, 2008. http://www.cdc.gov/flu/weekly/

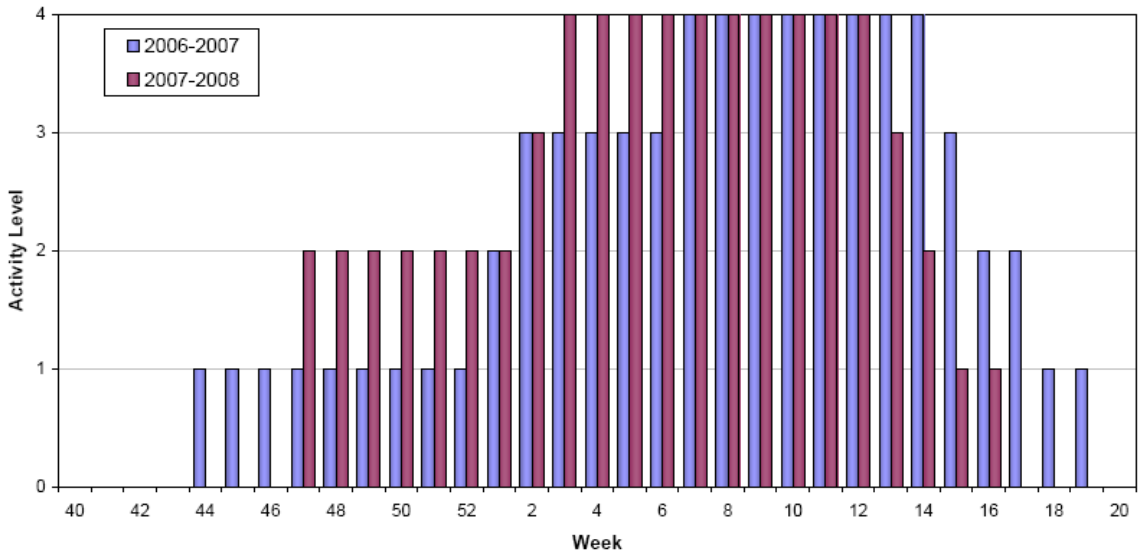
[5] CDC. Update: influenza activity---United States, September 30, 2007--April 5, 2008, and composition of the 2008--09 influenza vaccine. MMWR 2008;57:404--9. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5715a4.htm

[6] CDC. Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP),2008. MMWR 2008;57. July 17, 2008. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr57e717a1.htm.

influenza vaccine composition recommended for use in the 2008-2009 influenza season in the United States is identical to that recommended by the World Health Organization on February 14, 2008 for the Northern Hemisphere's 2008-2009 influenza season. All three strains are different from the 2007-2008 Northern Hemisphere influenza vaccine.

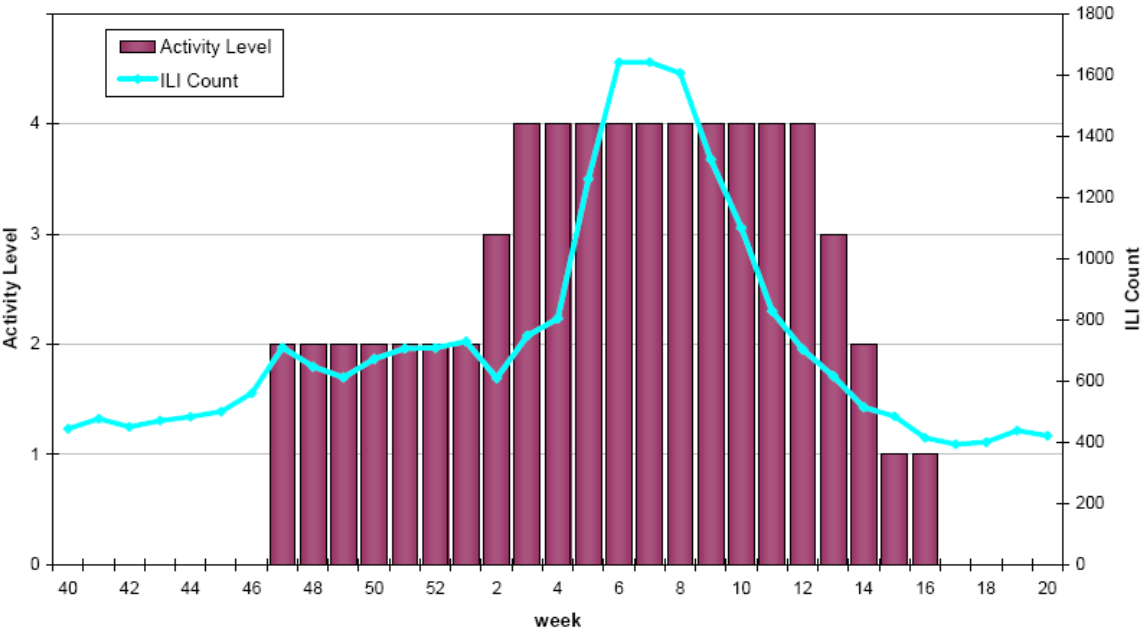
Appendix A. Graphs and Charts

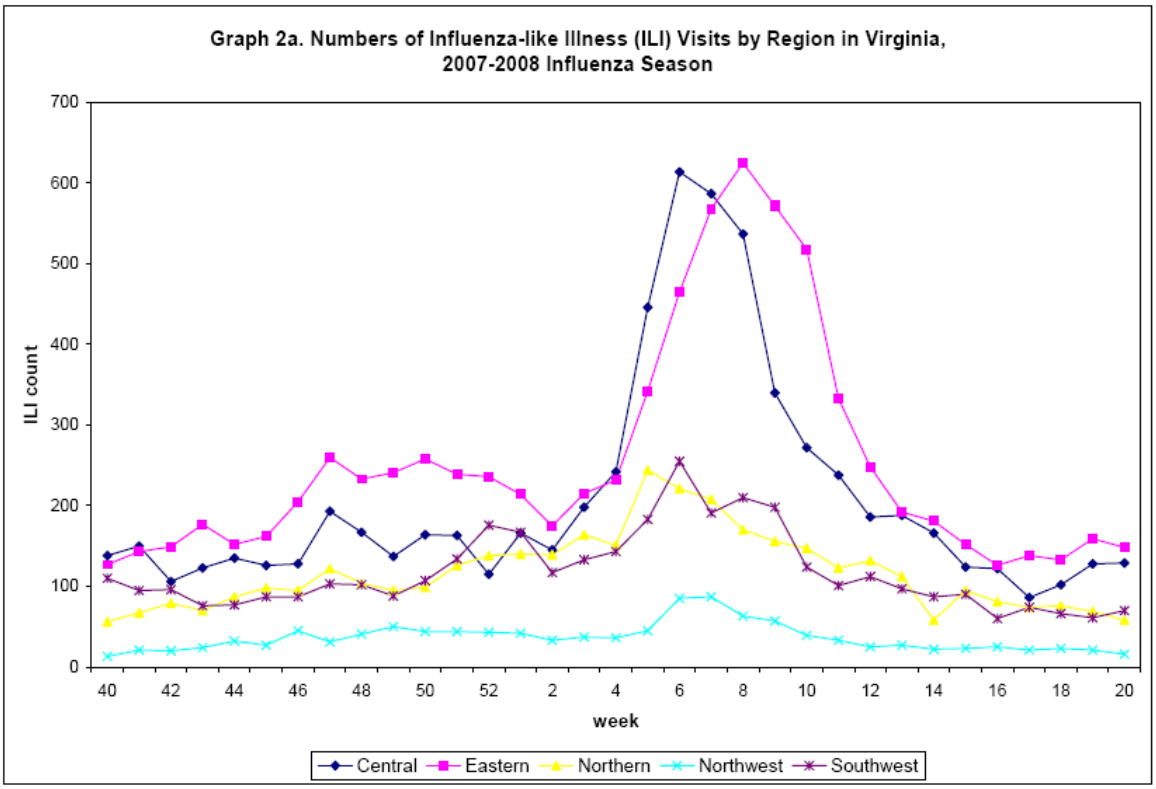
Graph 1a. Comparison of Weekly Influenza Activity Levels in Virginia for the 2006-2007 and 2007-2008 Influenza Seasons: Based on Hopsital ED and Urgent Care Data

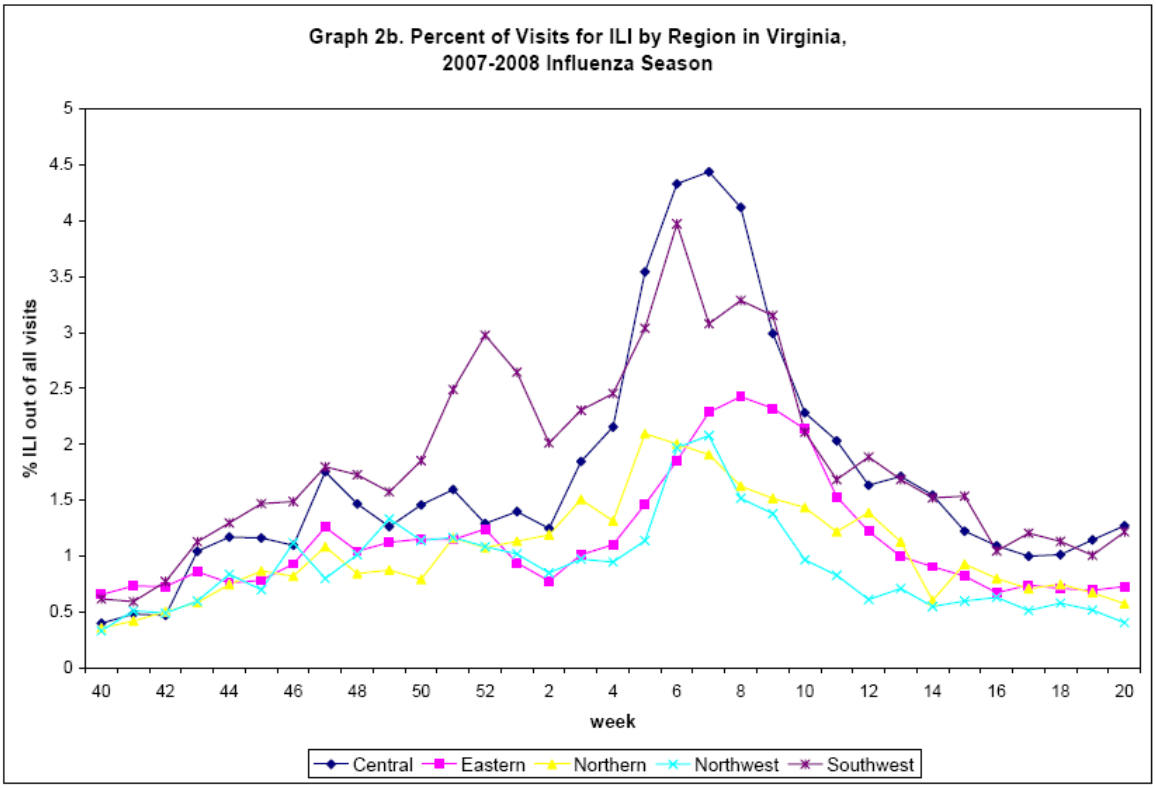


Data are presented by week, with the first Sunday to Saturday week in January as week 1.
Activity Levels: 0 = No Activity, 1 = Sporadic, 2 = Local, 3 = Regional, 4 = Widespread.
For a more detailed explanation of activity levels, see:
http://www.vdh.virginia.gov/Epidemiology/Surveillance/Influenza/index.htm

Graph 1b. Comparison of Weekly Influenza Activity Level and ILI Count in Virginia, 2007-2008 Influenza Season




Graph 2a. Numbers of Influenza-like Illness (ILI) Visits by Region in Virginia, 2007-2008 Influenza Season
ILI count
0
100
200
300
400
500
600
700
40
42
44
46
48
50
52
2
4
6
8
10
12
14
16
18
20
week
Central
Eastern
Northern
Northwest
Southwest


Graph 2b. Percent of Visits for ILI by Region in Virginia, 2007-2008 Influenza Season
% ILI out of all visits
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
40
42
44
46
48
50
52
2
4
6
8
10
12
14
16
18
20
week
Central
Eastern
Northern
Northwest
Southwest

Appendix A. Graphs and Charts